The inclusion of physicians'attributes is critical for discrete choice experiments. This study identifies some statistically significant attributes such as the referral process. It confirms previous results by Miele, Weiland and Dungan (2012) showing how patient can benefit from reduction in HbA1C with centralized referral. Further development investigates how significant physicians' attributes can impact reversed conjoint modeling results on physicians' cost sensitivity.

PRM62

INCORPORATING A PHARMACOMETRIC MODEL-BASED META-ANALYSIS INTO A HEALTH ECONOMIC MICROSIMULATION MODEL OF COPD

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OBJECTIVES: The study objective was to utilize a pharmacometric model-based meta-analysis (PMBMA) within a health economic microsimulation model (HEMM) of chronic obstructive pulmonary disease (COPD). PMBMA is a type of meta-regression which employs non-linear models estimated on trial-level data to relate patient and trial characteristics, dosing, surrogate markers, and outcomes effects of treatment. **METHODS:** A Markov microsimulation model was developed to estimate monthly changes in the key disease severity metrics of COPD (FEV1 and exacerbations) in order to compare a hypothetical drug that increases FEV1 to usual care. The PMBMA was used to predict a baseline exacerbation rate in a group of actual trial patients, given their known baseline FEV1. The hypothetical drug increased baseline FEV1, thereby decreasing the exacerbation rate in the hypothetical drug arm vis-à-vis the individual PMBMA predictions. Individual patient microsimulations and model memory allowed the rate monthly FEV1 decline to vary by patient and by month allowing for stochastic improvements. Validation of trial-level PMBMA estimates used in predictions was performed. Issues of synchronizing non-COPD mortality and common random numbers in microsimulation models were addressed. **RESULTS:** In a sample of 376 trial patients with a mean FEV1 (percent predicted) of 55%, had an exacerbation rate of 0.7 exacerbations per year, as predicted by the PMBMA. A drug that increased FEV1 at baseline by 30 mL resulted in a 21% decrease in exacerbations, while a 50 mL increase resulted in a 26% decrease. Given a simplified estimation of costs and QALYs associated with COPD, a drug with a 50 mL increase costing 40 Euro per month had an ICER of 46,736 Euro/QALY. **CONCLUSIONS:** The synergistic aspects of PMBMA and HEMM are highlighted in this hypothetical example. Markov microsimulation modeling allows the finer predictions of PMBMA to inform parameters while individual simulations allow advantages of model memory.

PRM63

A GUIDE ON HOW TO SPEEDUP COMPUTATION TIME IN CE-MODELS USING VBA OR MULTI-PROCESS PROGRAMMING IN C++

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OBJECTIVES: There is a trend of health economic models (HEM) becoming computationally expensive. Additionally, less complex HEMs increasingly include some type of computationally demanding analysis like value of information (VOI; e.g. EVPI, EVPPI). However, the computation time required to perform such analyses are often stated as the primary constraint. Our objective was to determine whether efficiency could be achieved using programming languages and multi-process programming to substantially speedup the simulation time for HEMs. **METHODS:** Two different techniques were applied, firstly an implementation solely in VBA, secondly parallel computing implementation in C++. The general complexity of VOI-analysis in HEMs algorithms is due to nested loops. Multi-process programming is suitable for these tasks as it decomposes complex routines into small parts which are solved concurrently. A publicly available hip-replacement Markov model in Excel® served as a blueprint. It was reconstructed using the two aforementioned techniques, both replicas used the spreadsheet application as the interface, but calculations were performed in their respective programming environments. The computational time required to perform the EVPPI-analysis for each one of these techniques were compared. All computations were performed in an identical computational environment. Outcomes were compared to ensure there were no systematic differences in the underlying calculations. **RESULTS:** The VBA implementation of the hip-replacement model reduced simulation time by up to 7X compared to the original model. The improvement for the multiprocessing in C++ was 10X compared to the VBA implementation when running on a quad-core environment. **CONCLUSIONS:** This study demonstrated that the computation time of the selected HEM was improved considerably using the same language, primarily by minimizing the communication between VBA and spreadsheet. A more substantial improvement (~70X) was gained when using the multiprocessor capabilities in C++ combined with machine-level optimization. However, to achieve this speedup, more development time and may accompany reluctance due to specialist programming expertise.

PRM64

A MODEL SIMULATING EXTERNAL REFERENCE PRICING TO SUPPORT POLICY DECISION MAKING IN EUROPE

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OBJECTIVES: The objective of this project was to build a model simulating the external reference pricing (ERP) process, applied to the 28 European Union Member States, Iceland, Norway and Switzerland, to understand the price dynamics of ERP-based systems and predict the consequences of various ERP policy scenarios. **METHODS:** A discrete-event simulation (DES) modelling approach was adopted. This approach allowed for fixed ERP rules and quick dynamic changes. Three groups of attributes were included in the model: ERP policy attributes, drug attributes and countries' economic attributes. Occurrences of the following events were simulated: drug launch and first price setting, pricing decisions using ERP in different countries, exchange rate fluctuations, country's attributes modification, and drug price changes. Each price evaluation event implied the calculation of a new drug price and the model generated drug price evolution in each country over time. Model inputs were obtained from a literature review and consultation of representatives of competent authorities and international organizations. The model was validated by assessing actual drug prices at launch and over time for 53 randomly selected medicines. This model was developed for the EU Commission. **RESULTS:** The model could be used to assess the impact of pricing policies. For example, it showed that the price erosion predicted under the effects of ERP only was for most products slower than observed in reality, and thus that price negotiations also importantly contributed to price erosion. It can also be used to compare alternative launch sequences. The simulated price trends over time were consistent with observed trends. **CONCLUSIONS:** This DES model is the first comprehensive ERP published model across drug life cycle that allows testing various policy scenarios and predict impact of ERP in the real-life. This flexible model may prove useful tool to support decision making from the perspective of authorities or industry.

PRM65

REVIEW OF MODELS USED IN ECONOMIC ANALYSES OF NEW ORAL TREATMENTS FOR TYPE 2 DIABETES MELLITUS

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OBJECTIVES: This study aimed to provide insight into the utilization of cost-effectiveness modeling methods. The focus of our study was aimed at the applicability of these models, particularly around the major assumptions related to the clinical parameters used in the models, and subsequent clinical outcomes. **METHODS:** MEDLINE and EMBASE were searched from 1 January 2004 to 14 February 2013 in order to identify published cost-effectiveness evaluations for the treatment of T2DM by new oral treatments (GLP-1 receptor agonists and DPP-4 inhibitors). Once identified, the articles were reviewed and grouped together according to the type of model and study comparators. **RESULTS:** A total of 15 studies were identified in our review. Nearly all of the models utilized a health care payer perspective and provided a lifetime horizon. The CORE Diabetes Model, UKPDS Outcomes Model, Cardiff Diabetes Model, CDC Diabetes Cost- Effectiveness Group Model and Diabetes Mellitus Model were cited. Nearly all of the studies made significant assumptions surrounding the impact of GLP-1 receptor agonists or DPP-4 inhibitors on clinical parameters and subsequent short- and long-term outcomes. The impact of these clinical changes often resulted in large lifetime changes in health outcomes in the models. The validity of these projections, particularly for the longer time frames, is questionable. **CONCLUSIONS:** Future models should aim to include all relevant treatment outcomes, whether these relate to effects on underlying diabetes and its complications or to short- or long-term side effects of treatment. We need to explore why cost-saving interventions could benefit further from adding patient characteristics, which may be able to better predict the use of lower-cost alternatives. Moreover, the vast array of different clinical, cost and utility data used in the different models reviewed makes it apparent that a uniform methodology should be developed for diabetes economic models.

PRM66

ESTIMATING THE TIME TRADE-OFF VALUES OF THE EQ-5D-5L HEALTH STATES IN URBAN CHINA

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OBJECTIVES: The EQ-5D-5L is a new health-state classification system consisting of five dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression), with each dimension described into five problem levels (no, slight, moderate, severe, and extreme). This study aimed to estimate the time trade-off (TTO) values of the 3,125 EQ-5D-5L health states to urban residents in China. **METHODS:** The values for 86 selected EQ-5D-5L health states were elicited using the 'composite' TTO technique from a general population sample (n=1,250) drawn from 5 Chinese cities. In computer-assisted personal interviews, participants each valued a randomly selected block of health states (n=10). Various function forms were constructed to specify the possible relationship between TTO values and health-state characteristics and estimated using linear regression models. The function form exhibiting the best fit of the data and the least prediction biases was identified to estimate the values of all EQ-5D-5L health states. **RESULTS:** The Hausman test suggested that random effects estimator was more efficient than fixed effects estimator for all function forms. The best model comprised a constant and twenty-one dummy variables indicating the presence or absence of specific problems or patterns of problems in a given EQ-5D-5L health state, including nineteen for all individual health problems except for slight anxiety/depression, one for severe or extreme problems in any functional dimensions, and one for the 5 mildest EQ-5D-5L health states. According to the final model, the mean absolute error of the predicted values for the 86 health states was 0.032 and the range of all the predicted values was -0.339 to 0.893. **CONCLUSIONS:** Values of EQ-5D-5L health states can be estimated using time trade-off values of a small portion of the health states. The EQ-5D-5L preference values estimated in this study may be used as quality-of-life weights in cost-utility analysis of health technologies and programs in China.

PRM67

IDENTIFYING AND CHARACTERIZING TRAJECTORIES OF QOL IN PERSONS WITH ADVANCED CANCER: IMPORTANT CONTRIBUTORS TO DECREASING QOL IN PEOPLE WITH CANCER

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OBJECTIVES: In cancer, we aim at maintaining the Quality of Life (QOL) of patients. Yet minimal work examines predictors of QOL constructs over time. The aim of this study was to explore the temporal sequence leading to optimal QOL over time of key